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FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER	
JERABEK, KELLY L	

ART UNIT	PAPER NUMBER
2612	

DATE MAILED: 09/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/698,241	SUDA, YASUO	
	Examiner	Art Unit	
	Kelly L. Jerabek	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 June 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-16 and 20-22* is/are rejected.

7)☒ Claim(s) *17-19* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Response to Arguments

Applicant's arguments with respect to claims 1, and 3-22 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 7, and 22 rejected under 35 U.S.C. 102(b) as being anticipated by Muramoto et al. US 5,485,209.

Re claim 1, Muramoto discloses in figure 1 an optical arrangement including a photographing lens (1) and an image pick-up means such as a CCD (2) (col. 4, lines 34-44). A light-shielding member is arranged in the optical path to split the exit pupil of the photographing lens (1) and allow passage of a portion of light into a first pupil (3) and a second pupil (4) in order to obtain a plurality of pieces of image information (col. 4, lines 45-54). Therefore, the CCD (2) serves as a first photoelectric conversion unit that performs photoelectric conversion of a light beam of a first pupil area (3) and the CCD (2) also serves as a second photoelectric conversion unit that performs photoelectric conversion of a light beam of a second pupil area (4) different from the first pupil area (3). A calculation circuit (7) obtains the distance between object images formed on the surface of the CCD (2) and based on the light beams passing through the different pupil areas in order to calculate a defocusing amount (col. 6, lines 4-11). Therefore, the calculation circuit (7) is a detecting unit that detects a focus condition of the image pickup optical unit on the basis of the photoelectric conversion outputs of the CCD (2) corresponding to the two different pupil areas. In addition, Muramoto states that the light-shielding member (101) is detachably inserted into the photographing optical path. Therefore, it can be removed from the optical path of the image pick-up optical unit.

Re claim 7, figures 1, 22, 23, and 25 show different light blocking members. In each of these figures it can be seen that the openings have the same size and shape. In figure 1, openings 3 and 4 have the same size and shape. In figures 22 and 23, the openings are squares of equal size. In figure 25, openings 402 a-c are circles or equal size.

Re claim 22, see claim 1.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 5-7, 9-16, 20 and 22 rejected under 35 U.S.C. 102(e) as being anticipated by Higashihara et al. US 6,473,126.

Re claim 1, Higashihara discloses in figure 1 a camera provided with a focus-detecting device. A diaphragm disk (3a) is arranged in the optical path to split the exit pupil of the lens group (1a) and allow passage of a portion of light through a right pupil and a left pupil and onto a CCD (4) in order to obtain a right image (1) and a left image

(2) (col. 6, line 52 – col. 7, line 38). Therefore, the CCD (4) serves as a first photoelectric conversion unit that performs photoelectric conversion of a light beam of a first pupil area (right pupil) and the CCD (4) also serves as a second photoelectric conversion unit that performs photoelectric conversion of a light beam of a second pupil area (left pupil) different from the first pupil area (right pupil). The auto focusing image data consisting of the right image (1) and the left image (2) are used in a correlation calculation for determining the defocus amount (col. 8, lines 31-45). Therefore, a focus condition of the image pickup optical unit is detected on the basis of the photoelectric conversion outputs (1) (2) of the CCD (4) corresponding to the two different pupil areas (right pupil, left pupil). In addition, Higashihara states that a motor (3d) rotates the diaphragm disk (3a) to bring a desired diaphragm into the optical path (col. 6, lines 65-67). It can be seen in figures 2A-2C that when the diaphragm is rotated different openings are brought into the optical path. When section with two pupil openings is brought into the optical path as shown in figure 2A, a certain part of the diaphragm is blocking light in the optical path. However, when the aperture opening one space clockwise from the two pupil openings is brought into the optical path all of the light in the optical path is allowed through. Therefore, the light-blocking unit can be removed from the optical path of the image pick-up optical unit by rotating the diaphragm disk (3a).

Re claim 5, Higashihara states that when an auto-focusing operation is performed, the system control unit (7) rotates the diaphragm disk (3a) in order to bring the pupil-dividing diaphragm into the optical path (col. 7, lines 5-21).

Re claim 6, Higashihara states that correlation of the image data formed by the light beam passing through the left pupil (left image) and the image data formed by the light beam passing through the right pupil (right image) is calculated between the two sets of image data. The correlation is calculated by a "max algorithm" that adds the left image and the right image (col. 8, lines 40-59).

Re claim 7, figures 2a and 2b disclosed by Higashihara show the rotatable diaphragm. In each of these figures it can be seen that the two pupil openings have the same size and shape (circular).

Re claim 9, Higashihara states that a motor (3d) rotates the diaphragm disk (3a) to bring a desired diaphragm into the optical path (col. 6, lines 65-67). It can be seen in figures 2A-2C that when the diaphragm is rotated different openings are brought into the optical path. When section with two pupil openings is brought into the optical path as shown in figure 2A, a certain part of the diaphragm is blocking light in the optical path. Therefore, the light-blocking unit is part of a rotatable diaphragm disk (3a).

Re claim 10, Higashihara states that a motor (3d) rotates the diaphragm disk (3a) to bring a desired diaphragm into the optical path (col. 6, lines 65-67). It can be seen in figures 2A-2C that when the diaphragm is rotated different openings are brought into the optical path. When section with two pupil openings is brought into the optical path as shown in figure 2A, a certain part of the diaphragm is blocking light in the optical path. However, when the aperture opening one space clockwise from the two pupil openings is brought into the optical path all of the light in the optical path is allowed through. Therefore, the light-blocking unit can be removed from the optical path of the image pick-up optical unit by rotating the diaphragm disk (3a).

Re claim 11, Higashihara states that a motor (3d) rotates the diaphragm disk (3a) to bring a desired diaphragm into the optical path (col. 6, lines 65-67). It can be seen in figures 2A-2C that when the diaphragm is rotated different openings other than the pupil openings are brought into the optical path.

Re claim 12, the auto focusing image data consisting of the right image (1) and the left image (2) are used in a correlation calculation for determining the defocus amount (col. 8, lines 31-45). Therefore, a focus condition of the image pickup optical unit is detected on the basis of the photoelectric conversion outputs (1) (2) of the CCD (4) corresponding to the two different pupil areas (right pupil, left pupil). In addition, Higashihara states that a motor (3d) rotates the diaphragm disk (3a) to bring a desired diaphragm into the optical path (col. 6, lines 65-67). It can be seen in figures 2A-2C that

when the diaphragm is rotated different openings are brought into the optical path. When section with two pupil openings is brought into the optical path as shown in figure 2A, a certain part of the diaphragm is blocking light in the optical path.

Re claim 13, Higashihara states that a motor (3d) rotates the diaphragm disk (3a) to bring a desired diaphragm into the optical path (col. 6, lines 65-67). It can be seen in figures 2A-2C that when the diaphragm is rotated different openings other than the pupil openings are brought into the optical path.

Re claim 14, it can be seen in figures 2A-2C that each of the plurality of selectable openings has a different size.

Re claim 15, Higashihara states that a motor (3d) rotates the diaphragm disk (3a) to bring a desired diaphragm into the optical path (col. 6, lines 65-67). It can be seen in figures 2A-2C that when the diaphragm is rotated different openings other than the pupil openings are brought into the optical path.

Re claim 16, the auto focusing image data consisting of the right image (1) and the left image (2) are used in a correlation calculation for determining the defocus amount (col. 8, lines 31-45). Therefore, a focus condition of the image pickup optical unit is detected on the basis of the photoelectric conversion outputs (1) (2) of the CCD (4) corresponding to the two different pupil areas (right pupil, left pupil). In addition,

Higashihara states that a motor (3d) rotates the diaphragm disk (3a) to bring a desired diaphragm into the optical path (col. 6, lines 65-67). It can be seen in figures 2A-2C that when the diaphragm is rotated different openings are brought into the optical path. When section with two pupil openings is brought into the optical path as shown in figure 2A, a certain part of the diaphragm is blocking light in the optical path.

Re claim 20, the auto focusing image data consisting of the right image (1) and the left image (2) are used in a correlation calculation for determining the defocus amount (col. 8, lines 31-45). Therefore, a focus condition of the image pickup optical unit is detected on the basis of the photoelectric conversion outputs (1) (2) of the CCD (4) corresponding to the two different pupil areas (right pupil, left pupil). In addition, Higashihara states that a motor (3d) rotates the diaphragm disk (3a) to bring a desired diaphragm into the optical path (col. 6, lines 65-67). It can be seen in figures 2A-2C that when the diaphragm is rotated different openings are brought into the optical path. When section with two pupil openings is brought into the optical path as shown in figure 2A, a certain part of the diaphragm is blocking light in the optical path. In addition, figures 2A-2C clearly show that only one opening can be in the optical path at one time. Therefore, one of the plurality of openings and the light blocking unit (blocking part of the pupil divided portion of the diaphragm) are not set in the optical path at the same time.

Re claim 22, see claim 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3 and 4 rejected under 35 U.S.C. 103(a) as being unpatentable over Muramoto in view of Hokari et al. US 6,618,087.

Re claim 3, Muramoto discloses all of the limitations of claim 1 above. However, Muramoto fails to state that a microlens is located in front of the plurality of photoelectric conversion elements of the first and second photoelectric conversion units.

Hokari discloses in figure 3 a conventional solid-state imaging device with a microlens (114) placed in front of the photoelectric conversion elements of the solid-state imaging device (col. 5, lines 12-24). Therefore, it would have been obvious for one skilled in the art to have been motivated to include the solid-state imaging device with a microlens placed in front of its photoelectric conversion elements as disclosed by Hokari in the optical arrangement including a photographing lens (1) and an image pick-up means as disclosed by Muramoto. Doing so would provide a means for redirecting

or focusing incident light beams onto the photoelectric conversion elements of a solid-state imaging device (Hokari: col. 5, lines 18-24).

Re claim 4, Hokari states that a color filter (113) is placed in front of the photoelectric conversion elements of the solid-state imaging device (col. 5, lines 18-24).

Claim 21rejected under 35 U.S.C. 103(a) as being unpatentable over Muramoto in view of Hokari and further in view of applicant's admitted prior art.

Re claim 21, Muramoto in view of Hokari discloses all of the limitations of claim 3 above. However, Muramoto in view of Hokari fails to distinctly state that the microlens projects a projection image that is larger than an entire exit pupil of the image pickup optical unit onto the plurality of photoelectric conversion elements.

The applicant states in the specification (page 4, line 18 – page 5, line 10) that image pickup elements employing a microlens array to form one or two pairs of images through the use of a light beam passing through a portion of the pupil of the image pickup optical system is well known in the art. The applicant's specification also states that the power of each microlens is set so that each of the light-receiving sections of the image pickup element is projected to an exit pupil (specification: page 4, lines 22-25). The projection magnification may be selected so that a projected image on each light-receiving section is larger than the exit pupil of the image pickup optical system (specification: page 5, lines 6-10). Therefore, it would have been obvious for one skilled

in the art to have been motivated to include the microlens with a projection magnification set so that the projected image is larger than an exit pupil of the optical system as disclosed by the applicant's admitted prior art in the optical arrangement including a photographing lens (1) and an image pick-up means including a microlens as disclosed by Muramoto in view of Hokari. Doing so would provide a means for magnifying the light passed through a microlens so that a projected image on a light-receiving section is larger than an exit pupil of an image pickup optical system (specification: page 5, lines 6-10).

Claim 8 rejected under 35 U.S.C. 103(a) as being unpatentable over Muramoto in view of Okano et al. US 4,047,807.

Re claim 8, Muramoto discloses all of the limitations of claim 7 above. However, Muramoto fails to distinctly state that the first and second openings have an elliptical shape.

Okano discloses in figure 4 a diaphragm device for a camera. The aperture shape of the diaphragm device may assume the shape of an ellipse (col. 6, lines 20-25). Therefore, it would have been obvious for one skilled in the art to have been motivated to include the diaphragm device capable of forming an elliptical aperture opening as disclosed by Okano in the optical arrangement including a photographing lens (1) and an image pick-up means as disclosed by Muramoto. Doing so would provide a means

for allowing the aperture shape to take on the form of an ellipse in order to allow light to pass in an elliptical shape (Okano: col. 6, lines 20-25).

Allowable Subject Matter

Claims 17-19 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record fail to anticipate or render obvious the following technical features as recited in the highlighted claims:

Referring to claims 17-19, the prior art fails to teach or suggest "...wherein said rotatable diaphragm comprises a plurality of pairs of openings for allowing passage of light, with said first and second openings being one of said plurality of pairs of penings, and wherein said rotatable diaphragm is used in conjunction with another rotatable diaphragm having a plurality of openings for allowing passage of light, each one of said plurality of openings having a different size".

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ide (US 6,781,632) discloses an image pick-up apparatus capable of focus detection. The material regarding microlenses is pertinent material.

Satoh (US 6,700,615) discloses an autofocus apparatus. The material regarding a movable diaphragm is pertinent material.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contacts

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kelly L. Jerabek whose telephone number is 703-305-8659. The examiner can normally be reached on Monday - Friday (8:00 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy Garber can be reached on 703-305-4929. The fax phone number for submitting all Official communications is 703-872-9306. The fax phone number for submitting informal communications such as drafts, proposed amendments, etc., may be faxed directly to the Examiner at 703-746-3059.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KLJ

NGOC-YEN VU
PRIMARY EXAMINER